

## United States Patent [19]

Berreman

[11]

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## [54] VARIABLE FOCUS LIQUID CRYSTAL LENS SYSTEM

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350/347

[58] Field of Search ..... 350/331, 335, 347

## [56] References Cited

## U.S. PATENT DOCUMENTS

3,876,287	4/1975	Sprokel	.....	350/347
3,881,808	5/1975	Gurtler et al.	.....	350/335

3,955,208	5/1976	Wick et al. ....	350/335 X
4,037,929	7/1977	Bricot et al. ....	350/347
4,066,334	1/1978	Fray et al. ....	350/331
4,066,335	1/1978	Courtney et al. ....	350/331 X

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## [57] ABSTRACT

An optical lens system is disclosed which comprises a body of a nematic liquid crystal material placed in a variable electric or magnetic field. In response to variation of the field strength from zero to an upper limit, the focal length of the lens system changes continuously from a first focal length to a second focal length. The new lens system may be used, e.g., in cameras, telescopes, binoculars, projectors, and eyeglasses.

11 Claims, 3 Drawing Figures

